

things, the law that the optical effect varies as the square of the resultant electric force.

At the meeting of the British Association in Glasgow in 1876, the president, Prof. Andrews, made a pointed reference to these early experiments of Dr. Kerr, but little dreamed that in a few days the whole scientific world would be positively "electrified" by the announcement of the great discovery known as the Kerr effect. Not only did Kerr announce the discovery, but he demonstrated it with the simplest of apparatus before the meeting of Section A. The paper containing a full account of these experiments was published in 1877 (*Phil. Mag.*, vol. iii., pp. 321-343). The great fact established was that the plane of polarisation of a ray of plane polarised light reflected from the end of the iron core of an electromagnet is rotated under influence of the magnetising current, in a direction contrary to the conventional direction of the current. In a later paper (*Phil. Mag.*, vol. v., pp. 161-177) the like phenomenon was established for light reflected from the sides of the magnetised iron. These remarkable experiments form the starting point for a prolonged series of delicate measurements in magneto-optics by several experimenters, of whom we may mention specially Righi, Kundt, Du Bois, Sissingh, Zeeman, and Drude.

On the theoretical side Fitzgerald (*Phil. Trans.*, 1880) was the first to attempt a discussion of the Kerr effect. In this effort he broke "new ground," as Maxwell expressed it; and although the theory was not comprehensive enough, nevertheless (to quote from Larmor, who has himself greatly developed the whole electromagnetic theory) "Fitzgerald's analytical work still remains applicable. The extension to metallic media is now formally made, as Ohm's law indicates, by taking the refractive index to be a complex quantity; with this generalisation the analysis has been extended by various writers, including Lorentz, Goldhammer, and Drude, but most completely by Leatham and Wind, and shown to embrace satisfactorily all the mass of detail that has been brought out in recent years in experimental magneto-optic investigations."

Dr. Kerr's latest paper on this subject (*Proceedings of the Royal Society*, 1894) described experiments on a fundamental question in electro-optics: "Reduction of Relative Retardations to Absolute." In 1888 (*Phil. Mag.*, xxvi., pp. 321-341) he published a well-planned and carefully-executed series of experiments on the birefringent action of strained glass. His last contribution to scientific literature was a note read before the British Association in 1901 on the "Brush Grating and its Optical Action."

Before the great scientific events of his life the University of Glasgow showed their appreciation of Dr. Kerr as an educationist by conferring on him in 1868 the honorary degree of Doctor of Laws. He was elected F.R.S. in 1890, and was awarded a Royal medal in 1898. He died August 18, 1907, after enjoying six years' retirement from official duties in the Normal College. Here, in limited accommodation, with still more limited apparatus, and only by devoting evening hours and precious holidays to research, John Kerr made the discoveries which have linked his name for all time with that of the immortal Faraday.

C. G. K.

NOTES.

PROF. M. H. E. TSCHERNING, director of the ophthalmological laboratory of the Sorbonne, Paris, has accepted the invitation of the council of the Optical Society to deliver the first Thomas Young oration on Thursday, October 10, and has chosen for its title "The Development of the Science of Physiological Optics during the Nineteenth Century." The oration has been established for the purpose of providing an annual lecture on some subject connected with physical, geometrical, or physiological optics, and thus to further the development of those branches of science with which the name of Thomas Young is intimately associated. The orator is elected annually by the council of the Optical Society from persons eminent in these branches of science or technology.

A VERY interesting and instructive exhibit has just been added to the public galleries of the geological department of the British Museum (Natural History) in the form of an enlarged wax model of the Silurian arachnid *Eurypterus fischeri*. Remains of these creatures are found in such a wonderful state of preservation in the Upper Silurian strata of Oesel, in the Baltic, that Prof. G. Holm has succeeded in freeing from the matrix considerable portions and mounting them on glass slides in Canada balsam. The original chitin is preserved in an almost unaltered condition, and even the most minute details of the external surface are retained. From these materials it has been possible, under the superintendence of Dr. Calman, to construct the model now exhibited, which is double the natural size, and appears to be between 7 inches and 8 inches in length. The model is temporarily placed in the central hall.

WE learn from the *British Medical Journal* that a movement for the foundation of an institution which is to bear the name of Prof. Robert Koch is on foot in Germany, and a committee has been formed with the object of collecting money for the purpose. The chairman is Dr. von Studt, Prussian State Minister; the vice-president, Privy Councillor Althoff; the secretary, Prof. Schwalbe, editor of the *Deutsche medizinische Wochenschrift*; the treasurer, Dr. Paul von Schwabach, General Consul, Berlin. The institution, which is to be applied to the furtherance of research in all directions for the discovery of means of checking the diffusion of tuberculosis, is intended to be a permanent memorial of the discovery of the tubercle bacillus by Prof. Koch twenty-five years ago. Appeal is made for contributions sufficient to make the institution a tribute of gratitude to Koch, similar to those with which the name of Pasteur has been honoured in France and that of Lister in England.

It is announced in the *Times* that the Government has completed negotiations for the purchase of the estate of Inverliver, Argyllshire, with a view to its conversion into a State forest. The estate, which has an area of about 12,530 acres, extends for about nine miles along the western side of Loch Awe, stretching across to Loch Avich. It will be of much value as a centre of education in forestry, and arboriculturists in Scotland are gratified that their desires for the establishment of a demonstration area are about to be realised. The afforestation of Inverliver will at once be proceeded with according to a general scheme, which provides for a certain number of acres being planted each year. The estate will be under the management of the Office of Woods and Forests, and, though it will yield no immediate return, it is expected

that it will ultimately cease to be any financial burden to the State.

MAINLY at the instigation of the Hon. John Ferguson, C.M.G., the Government of Ceylon has granted to Dr. A. Willey, director of the Colombo Museum, a sum of 3000 rupees (200l.) to secure the services of a British anthropologist for the study of the Veddahs during 1908. Dr. C. G. Seligmann, who has made most admirable investigations in British New Guinea, has been invited to undertake this research, and we have the pleasure of stating that he has accepted the commission. The Cousins Sarasin have published a fine monograph on the physical anthropology of these interesting people, in which they have also given valuable information concerning their habits and customs; but the cultural life of these hunter folk has never been thoroughly investigated. Dr. Seligmann will mainly study the sociology and religion of the Veddahs, but he will also make his researches as complete as possible in other directions, and will pay especial attention to the old stone implements of the Veddahs, the recent discovery of which was duly announced in NATURE. He will receive cordial assistance from Dr. Willey, who has a practical knowledge of the Veddah country, and with this, and other help and information which will be offered to him, there is every reason to hope for a successful expedition. Dr. Seligmann, who will be accompanied by his wife, expects to sail at the end of November.

THE first exhibition of the Society of Colour Photographers, open free to the public, is being held at the offices of the *British Journal of Photography*, 24, Wellington Street, Strand, W.C. In organising the exhibition the society is appearing before the public for the first time since its formation a year ago, but its first year of active existence opportunely coincides with the appearance of simplified methods of colour photography, already described in these columns.

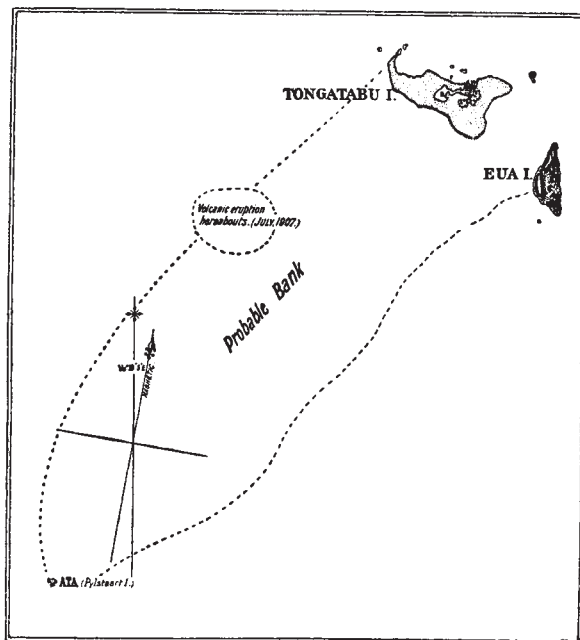
DR. W. S. BRUCE, Mr. Stewart Ross, and Mr. Gilbert Kerr returned to Edinburgh on Monday on the conclusion of the Scottish expedition to Prince Charles Foreland. Dr. Bruce told a Reuter representative that they have been able to make a detailed survey of the whole of the west coast of Prince Charles Foreland, of the interior with its mountains, and of a considerable portion of the east coast. Good zoological collections have been obtained, including a specially fine set of bird skins, a few seal skins, and the skeleton of a whale. Valuable geological and botanical collections have also been secured. A Reuter representative has also obtained details of the Arctic expedition undertaken by the Duc d'Orléans, who, together with Dr. Recamier, the surgeon and naturalist of the expedition, arrived in England on Monday. The expedition, which was on board the duke's Polar yacht *Belgica*, under the command of Captain de Gerlache, returned to Hammerfest on September 15. The scientific work accomplished will, it is said, prove of great interest.

WE have to acknowledge the receipt of a copy of the report of the museums of the Brooklyn Institute of Arts and Sciences for 1906, in which it is stated that the most important additions to the natural history department comprise a collection of sponges and corals made by the late Prof. H. A. Ward in Japan and Australia, and another of shells, late the property of Phebe L. Mumford. Considerable progress has been made in the mounting of realistic groups of mammals and birds, of several of which illustrations are given.

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BULLETIN No. 5 of the entomological division of the experiment station of the Hawaiian Sugar Planters' Association (published at Honolulu, August 2) is devoted to the sugar-cane leaf-roller, the caterpillar of the moth *Omiodes accepta*. The moths of this genus are regarded by Sir George Hampson as inseparable from *Phryganodes*, but this is not accepted by Mr. O. H. Swezey, the author of the report, who states that they agree more nearly with the diagnosis of *Nacoleia*. The caterpillars are very destructive to grass crops, rolling up and glueing together the edges of the blades, and then devouring the softer tissues.

CAPTAIN T. H. TIZARD, F.R.S., assistant hydrographer of the Admiralty, sends us a copy of a notice to mariners, issued on September 14, relating to a volcanic eruption near the Tonga or Friendly Islands, South Pacific Ocean. The notice states that information, dated July 29, 1907, has been received through the Government of the State of Victoria, that the Government of the Tonga Islands has given notice that a volcanic eruption is in progress about



Volcanic eruption near the Friendly Islands.

thirty miles south-west of the western point of Tongatābu (Niuanofu). The approximate position of the disturbance is lat. $21^{\circ} 25' S.$, long. $175^{\circ} 45' W.$ All the information received has been given in the notice, but probably fuller details will be eventually published. The accompanying illustration from Admiralty chart No. 3421 shows the approximate position of the eruption, and also that it appears likely that a bank runs south-west from Tongatābu towards Pylstaart Island, and that the eruption is situated near the edge of this bank.

ACCORDING to the report of the Government Museum and Connemara Library, Madras, for the year 1906-7, issued by the Educational Department of Madras, July 19, the erection of a new room for the prehistoric collection made by Mr. R. B. Potts is in contemplation. Considerable progress has been made in the anthropological and ethnological section, both in the matter of collections and publications. Unfortunately, the superintendent, Mr. E.

Thurston, has to deplore the loss, by theft, of a number of valuable gold and silver coins, mostly consisting of Roman Imperial solidi and denarii.

IN the third part of vol. ii. of the *Agricultural Journal of India* Mr. H. M. Tefroy gives coloured illustrations, with descriptive letterpress, of the various developmental stages of the two species of Indian locusts. Of these, the north-west locust (*Acridium peregrinum*) is normally a migratory species, inhabiting all districts, and giving rise to annual swarms. The Bombay locust (*A. succinctum*), on the other hand, is typically a native of the moist Western Ghats, and only occasionally assumes migratory swarms, the members of such flights assuming an abnormal red colouring. In the description of these different phases, on p. 241, the references to the figures are unfortunately incorrect. As to the black-spotted grasshopper (of which figures are also given), there is no evidence of its ever assuming migratory habits. The proper identification of migratory locusts from different parts of the country is a matter of some importance in connection, not only with the distribution of the species, but with agriculture.

IN the *Journal of Economic Biology* (vol. ii., No. 2) Mr. E. R. Burdon publishes particulars regarding the efficacy of spraying spruce trees in winter to destroy the Chermes or aphids that cause the pine-apple galls. The wash consists of an emulsion of soft soap and paraffin or a solution of soft soap. Dr. R. S. MacDougall communicates the results obtained in rearing broods of the pine-sawfly, *Lophyrus pini*, from unfertilised eggs, and Mr. C. G. Hewitt presents an account of the life-history of the root maggot, *Anthomyia radicum*.

IN his annual report for 1906-7, Mr. J. H. Hart, superintendent of the Botanical Department, Trinidad, notes that there has been a large demand for sugar-canes, cacao and rubber plants, also for young cedar, Honduras and native mahogany trees. A considerable quantity of budded stock of various citrus fruits was distributed, and an attractive variety of seedless orange, locally raised, was secured and budded, according to usual practice, on sour-orange stock to avoid the root-rot that is prevalent in the island. Hevea, Funtumia, and Castilloa were the rubber plants chiefly in request; the consignments of Castilloa rubber from Trinidad and Tobago attained to commercial quantities, and realised good prices. A number of camphor seedlings were successfully raised from imported seed, and date palms have received attention. A list is given of more than twenty palms that flowered in the gardens at St. Clair during the year.

THE scientific papers in the *Kew Bulletin*, No. 8, consist of a decade of diagnoses of new plants from the herbarium, an article by Mr. G. Massee on degeneration in potatoes, another on the cricket-bat willow by Mr. W. J. Bean, and a note by Mr. N. E. Brown defining the genus *Pergularia*. Mr. Massee refers to the experience of growers that "seed" potatoes often fail to form sprouts, and attributes the sterility to two causes, i.e. to arrest of development of the vascular system in the tuber, and to a want of sufficient diastase. The information regarding the willows is based on the collaboration of the cricketer, Mr. John Shaw, with the Rev. E. R. Linton, a leading exponent of varieties of willows. On this authority Mr. Bean states that *Salix alba*, var. *caerulea*, bearing pistillate flowers, yields the best timber, and that *Salix viridis* is suitable, although inferior to the former. Since, under favourable

conditions, trees grow to a merchantable size in twelve years, the cultivation affords a prospect of profitable remuneration.

THE "Flora of the Presidency of Bombay," prepared by Mr. T. Cooke, makes good progress, as the fourth part of the second volume, issued in July, deals with the concluding orders of the dicotyledons from Urticaceæ to Ceratophyllaceæ, the gymnosperms and the monocotyledons from Hydnopharitaceæ to Typhaceæ. Under the Urticaceæ the genus *Ficus* is prominent with eighteen species, one, *Ficus Talboti*, being endemic. Only two gymnosperms, i.e. *Ephedra foliata* and *Gnetum scandens*, are regarded as indigenous; the conifers, ten in number, and the two cycads noted are exotic, although *Cupressus glauca* receives the name of the Goa cypress. The Orchidaceæ, with thirty-one genera, include a number of species confined to the western peninsula, and several are endemic. The Scitamineæ and Palmæ contain numerous economic plants, many of them introduced, that are briefly described. Mr. Cooke has also given a key to Drummond and Prain's identifications of species of *Agave* and *Furcraea*.

THE writer of the article on "Archæological Discoveries in Egypt," which appeared in *NATURE* of September 12, desires to add that when the article was written nothing was yet known of the results of Prof. Petrie's excavations, which were therefore not mentioned. Since the proofs were corrected the annual exhibition at University College has been held, and has shown that Prof. Petrie's discoveries of this year, though by no means very exciting, have been interesting enough. The best things found are some splendid interments of the Twelfth Dynasty, with fine coffins and models of ships, &c., in perfect condition, from a tomb at Rifa, near Asyût. From other tombs in this neighbourhood Prof. Petrie recovered an interesting series of what he calls "soul-houses," which are the small clay models of dwellings often found in tombs of the VIth-XIIth Dynasty period. They are well represented in our museums, but Prof. Petrie has obtained some new and fine types. Prof. Petrie also excavated at Giza.

WE have received a long letter from the Rev. J. W. Hayes, West Thurrock Vicarage, Grays, Essex, with regard to the so-called "twin-chamber denehole" at Gravesend, recently described in the *Times*, and referred to in our notes on September 19 (p. 522). According to Mr. Hayes the two chambers were originally two distinct deneholes, each with its own shaft, and being in close proximity were brought into communication by a breach in the dividing wall, made after the excavation of the chalk. There is no true platform in either cavern, but a great quantity of sandy loam occupies the floor. In Mr. Hayes's opinion, the pick-marks on the roughly hewn walls could have been made only by an implement of metal, not by one of horn, bone, or flint; whilst he believes that the caves were certainly not used either as a dwelling or as a storehouse for grain.

IN a communication to the *Ceylon Observer* of August 10 Mr. J. Pole records the discovery of numerous Palæolithic stone weapons on hills at Imboolpittia, Ceylon. Similar discoveries have been made by the brothers Sarrasin, who have hitherto monopolised the study of that interesting forest race, the Veddahs. Mr. Pole, on rather shadowy grounds, attempts to connect the implements which he has discovered with the same tribe.

AN interesting report on the borax deposit of Lake Salinas, Peru, has been published by Mr. A. Jochamowitz (*Boletín del Cuerpo de Ingenieros de Minas del Peru*, No. 49). The so-called lake is dry for the greater part of the year, and the borax deposit is about 3 feet in thickness. It consists of ulexite, containing 30 per cent. of boric acid. The bed is impermeable, so that water cannot reach the lake at places where borate occurs. The borate is extracted by means of shallow pits, which become filled with water when the borate is removed. Reports have also been issued by Mr. W. Turner and Mr. J. J. Bravo on the geology of the River Chillón (*Boletín* No. 48), and by Mr. H. C. Hurd on the water supply of the valley of Lambayeque (*Boletín* No. 47).

THE current issue of the Proceedings of the American Philosophical Society (vol. xlvii., No. 185) covers two hundred pages, and contains seventeen papers of very varied interest. The most important memoir is a detailed account of the geology of the San Francisco peninsula, by Mr. Roderic Crandall. It describes the Montara granite, the Franciscan series, the Merced series (Pliocene), the Pleistocene beds, the serpentines, the igneous intrusive rocks, and the schists represented on the peninsula. The age and origin of the rocks are discussed, and an excellent coloured geological map is appended. Another paper of great interest is that by Mr. E. B. Titchener and Mr. W. H. Pyle on the effect of imperceptible shadows on the judgment of distance. Careful experiments show that such shadows, raised almost to the limit of perceptibility, exert no influence upon the judgments of distance by five observers. Mr. M. D. Ewell gives the results of a preliminary study of some modern micrometers. He collected a number of stage micrometers, and measured five to ten spaces on each with great care. The results show that no advance in precision has been made during the last twenty-five years. Indeed, the results do not seem to equal those of the former period. The papers of chemical interest deal with the measurement of the action of water on metals, the production of synthetic alcohol, and the association theory of solutions.

THE September number of *Symons's Meteorological Magazine* contains a useful paper by Mr. R. H. Curtis on the distribution of bright sunshine over the British Isles. Two forms of recorder have been in general use, the photographic and burning instrument, their records frequently differ considerably, and not always in the same direction. For the sake of uniformity, the Meteorological Office now only publishes records from the burning instrument, and these alone have been used in Mr. Curtis's discussion. Latitude being an important factor, we naturally find that the sunniest parts of the United Kingdom are the most southern, the annual total of hours' duration decreasing from 1900 hours in the Channel Islands to 1200 over the north of Scotland. A very clear map shows, however, that the lines of equal duration have a strong tendency to follow the coast lines both in east and west, and that a large portion of the central area of England and of the south-west of Scotland is adversely influenced by smoke and dust; in winter the largest totals of sunshine are obtained in the south-west. A great part of Ireland, central Wales, and the Highlands of Scotland are still very inadequately represented by sunshine recorders.

SEPTEMBER has proved an exceptionally fine and dry month over the entire kingdom, and in England the period without rain continued for about three weeks. Of the stations reporting to the Meteorological Office, the least measurement of rain for the month was 0.28 inch at

Yarmouth, which is only 12 per cent. of the average, whilst at Bath the percentage was 18, and at Liverpool 19. At many places in different parts of the kingdom there was less than 50 per cent. of the average. In London the aggregate measurement was 0.58 inch, which is 28 per cent. of the normal. The total measurement of rain since the commencement of the year is deficient, except in the extreme north and west. In London the deficiency amounts to 4.88 inches, and, so far, April is the only month with an excess of rain; the greatest deficiency in any month is 1.48 inches, in September. The duration of sunshine so far this year is, in London, fourteen hours more than the average, the excess occurring in January, February, March, and September. There were in all during the six summer months from April to September sixty-one days at Greenwich with the temperature 70° and above, and only two days with a temperature of 80°. The only years since 1841 with fewer days of 80° and above are 1860, when the thermometer did not once touch 80°, and 1862 and 1879, when there was only one instance of so high a temperature. The type of weather which prevailed with such persistence throughout September has now completely changed, and with October rains have become general.

A SUMMARY of the paper on the effects of heavy pressures on arc spectra, communicated by Mr. W. J. Humphreys to the American Physical Society, appears in the *Physical Review* for June. Pressure seems to increase the width of all lines and displace most of them towards the red by amounts approximately proportional to the pressure. The extent of the shift varies from line to line, and is practically independent of the amount of material used. The intensities of some lines are increased, of others decreased, by the pressure.

MR. E. F. NORTHROP directs attention in the *Physical Review* for June to the magnitude of the forces exerted by the parts of a non-electrolytic liquid carrying an electric current on each other, and describes several striking experiments in illustration. One of these consists in sending a large current through a narrow channel of mercury connecting two small reservoirs of mercury. With a current of 800 amperes a V-shaped depression half an inch deep formed at the centre of the channel, the mercury flowing into the reservoirs. A slight increase of the current broke the continuity of the mercury in the channel. On the liquid flowing together again the circuit was re-made, the arrangement thus constituting a slow and irregular interrupter.

IN the *Physikalische Zeitschrift* for September 15 Dr. K. E. F. Schmidt has an article on the "barretter," i.e. the bolometer when used to detect and measure rapid electrical oscillations. He shows that by enclosing the instrument in an oil bath the necessity for using two similar instruments is obviated. The "barretter" in series with a galvanometer of low resistance forms one arm of a resistance bridge, the other arms of which are wound so as to have considerable inductance, and thus confine the oscillating current to the "barretter," the terminals of which are connected to the circuit in which the oscillations are to be measured. The oscillating current heats the fine wire of the instrument, and thus disturbs the balance of the bridge by a measurable amount. The conditions for maximum sensitiveness are considered by Dr. Schmidt, and the results expressed in the form of curves.

UNDER the title "Grandeur et Décadence des Rayons-N : Histoire d'une Crovance," M. Henri Piéron gives in the

Année psychologique (vol. xiii., p. 143) a review of the history of the mysterious *n*-rays from the time when their discovery was first announced by M. Blondlot in 1903. A complete bibliography of the subject is appended which comprises in all 176 original papers, very unequally distributed as regards date, nineteen being published in 1903, 139 in 1904 (103 in the first half of the year), seven in 1905, and fifteen in 1906. After the surprising statement had been made that it was possible to chloroform metals, and thus by a process of anæsthesia, destroy their power of emitting the rays, and largely in consequence of Prof. R. W. Wood's letter in *NATURE* (vol. lxx., p. 530) throwing doubt on the existence of the rays, the *Revue scientifique* instituted an inquiry to ascertain whether other physicists who had worked on the subject had succeeded in verifying the remarkable statements made by MM. Blondlot, Charpentier, and Jean Becquerel. This inquiry, which has been briefly referred to in *NATURE* (vol. lxxi., pp. 113, 132, 157), showed that practically all those who had attempted to establish even the existence of the *n*-rays had entirely failed. A simple method of settling the question once and for all was then proposed by the *Revue scientifique*. A number of wooden boxes of exactly the same size and appearance were to be sealed up after enclosing in some of them small pieces of lead, in others rods of tempered steel, the latter being one of the recognised sources of the rays. It was to be left to M. Blondlot or his assistants to ascertain by experiments, made in presence of a committee of witnesses, which of the boxes contained the active material. This crucial test was, however, declined by M. Blondlot, who stated that "the phenomena were far too delicate for such a trial," and left "everyone to form his own opinion on the *n*-rays either from his own experiments or from his confidence in those of others." The subject was thus withdrawn from the region of fact and transferred to that of opinion. It is significant that from this time forward publication of further experiments practically ceased. A few attempts were made to obtain photographically objective evidence of the existence of the rays, but these did not withstand the test of criticism. It appears now established that the *n*-rays and their wonderful effects had no real existence, but that the results published in so long a series of papers were due to illusion caused by a species of auto-suggestion based on preconceived ideas. The matter forms, indeed, one of the most curious chapters, not only in the history of physical science, but also in that of psychology.

PAGES 1-78 of vol. ix. of the Proceedings of the Washington Academy of Sciences contain a very useful compilation, by Mr. James W. McBain, of all the experimental data referring to the quantitative measurement of electrolytic migration. Abstracts are given of all papers bearing on the subject between the years 1814 and 1905, the numerical results being summarised in the form of tables. In the introduction a brief discussion is given of the probable degree of accuracy of the determinations, of the errors introduced by the use of diaphragms and by the methods of calculation adopted; the interpretation of the results is also dealt with, a number of anomalous cases which are not in accord with the prevalent theory of solutions being considered separately, as well as the questions of hydrated and complex ions. The matter is arranged chronologically, but for convenience of reference indexes of substances and authors are appended. The compilation appears to be very complete, and its value is enhanced by the fact that a very large number of the papers bearing on the subject have titles which give no

indication that they contain experiments on electrolytic migration.

MESSRS. J. GRIFFIN AND SONS, LTD., have sent us a specimen of their new Bunsen burner, which they call an "Improved Teclu Burner." The Bunsen, as a matter of fact, is a slightly modified Marshall burner, the chief feature of which was that the air passes up from beneath the burner instead of being drawn in at the sides of the tube. The gas, on the other hand, passes in at the side, and not up the centre. The novelty in the burner is the arrangement for regulating the air supply, which is cone-shaped. We have tested the burner, and find it gives a good non-luminous flame, and can be turned extremely low without striking back. Even when at its lowest the flame is quite non-luminous.

THE new session of the Institution of Mechanical Engineers will be opened on Friday evening, October 18, when a paper on the indicated power and mechanical efficiency of the gas-engine, by Prof. B. Hopkinson, will be read.

OUR ASTRONOMICAL COLUMN.

NEW ELEMENTS AND EPHEMERIS FOR COMET 1907d.—The following set of elements has been calculated for comet 1907d by Herr Kritzing, from observations made on June 15, July 20, and August 28:—

$$\begin{aligned} T &= 1907 \text{ September } 3^{\text{h}} 9^{\text{m}} 7^{\text{s}} 92 \text{ M.T. Berlin.} \\ \omega &= 294^{\circ} 2' 37''.7 \\ \Omega &= 143^{\circ} 2' 33''.7 \quad 1907^{\circ} 0. \\ i &= 8^{\circ} 58' 6''.1 \\ \log q &= 9.709663. \end{aligned}$$

This appears in No. 4201 of the *Astronomische Nachrichten* (p. 15, September 20), and is followed by a daily ephemeris computed therefrom by Herr Spohn; the following extract gives the calculated positions and magnitude for every eighth day:—

Ephemeris 12h. (M.T. Berlin).						
1907	a 1907 ^o	δ 1907 ^o	log r	log Δ	Magni- tude	
	h.	m.				
Oct. 3	11 38.5	+ 3 17.9	9.9265	0.2458	6.9	
11	12 6.9	+ 1 6.3	9.9908	0.2776	7.4	
19	12 31.7	- 0 49.9	0.0472	0.3051	7.8	
27	12 53.6	- 2 30.8	0.0967	0.3290	8.1	
Nov. 4	13 13.2	- 3 58.9	0.1399	0.3492	8.5	

The magnitudes are derived from the magnitude at the time of discovery, which is taken as 8.0.

An ephemeris extending to December 30 is given by Herr J. Franz in No. 4200 of the *Astronomische Nachrichten* (p. 401, September 12).

An excellent reproduction of Mr. Plaskett's photograph, obtained at Ottawa on July 20, appears as the frontispiece to the current issue of the *Journal of the Royal Astronomical Society of Canada* (vol. i., No. 4).

SEPTEMBER METEORS.—A magnificent bolide was observed at South Kensington by Mr. F. E. Baxandall at 10.40 p.m. on September 19. Its path lay from near Saturn, where it first appeared, to a little south of Cassiopeia, where it was seen to explode and divide into two well-defined portions. The object was intensely brilliant, and travelled very slowly along its path of nearly seventy degrees.

THE ELECTRIC ACTION OF THE SUN AND OF THE MOON.—The results of some experiments on the electric action of the sun and moon, carried out by Dr. Nodon on the summit of the Pic du Midi, appear in No. 12 (September 16, p. 521) of the *Comptes rendus*, and are exceedingly interesting. Using an aluminium-leaf electrometer, so insulated that a charge of 1500 volts was retained for a week, Dr. Nodon found that the sun induced a positive charge, which varied considerably from one moment to another between one and six volts per minute. This charge was completely absorbed by clouds passing before the solar disc, but showed itself when a black card coated with paraffin was interposed between the sun and